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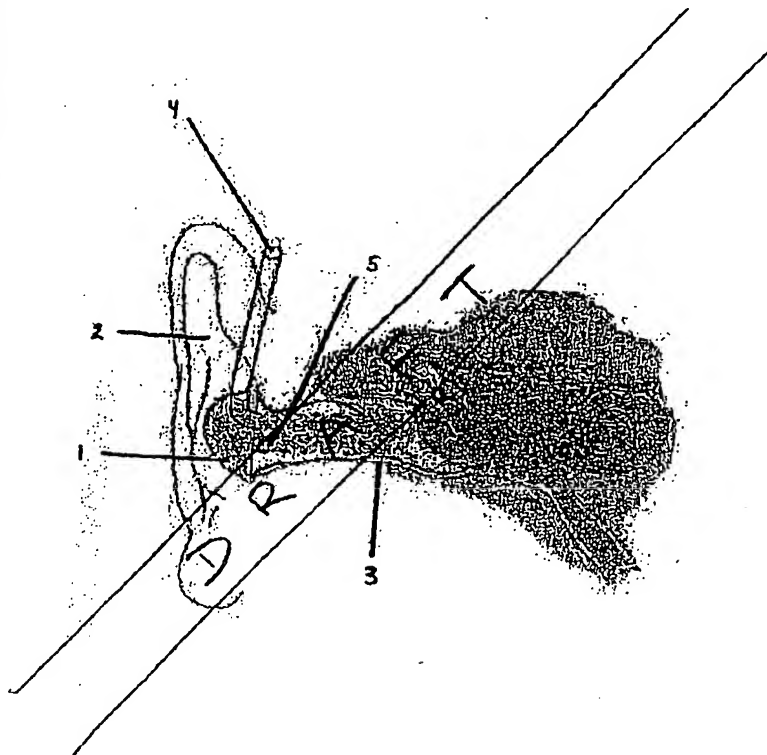
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(54) Title: DISPENSING OF HEARING AIDS



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(57) Abstract: A device  
aiding the dispensing of  
hearing aids which is able to  
test the perception of hearing  
and determining correct  
amplification of the hearing aid,  
whereby a plug adapted to be  
received in a client's ear has  
passing therethrough two tubes,  
one which carries the output  
sound from a source, normally  
a hearing aid programmed to  
compensate for the client's  
disability, into the ear and the  
other which acts as a vent. The  
device is designed to enable the  
hearing impaired person to get  
a truer more and more accurate  
indication of the sound output  
of a hearing aid.

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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette*

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## DISPENSING OF HEARING AIDS

This invention relates to the dispensing of hearing aids and, in particular, to a device which aids in such dispensing being particularly applicable to programmable hearing aids.

- 5 Many modern hearing aids are programmable. Programmability of hearing aids enables them to be able to be adapted to each individual's hearing impairment and, as such, can provide an aid which is more acceptable than was previously the case.

- Testing of an individual's hearing ability is usually performed with an audiometer which is able to test a range of frequencies from 125Hz to 8000Hz with a decibel range from  
10 -20dB to 120dB. This can be done through the use of headphones or ear insertions and provides the dispenser with an audiogram depicting a client's hearing capacity, thus enabling and indication of his/her impairment to be derived.

- The audiometry results enable programming of a "demonstration" behind the ear hearing aid. The sound output of this hearing aid can be amplified into the client's ear to provide  
15 the client with an indication of the desired amplification properties required to compensate for their hearing impairment.

The difficulty which occurs with these "demonstration" aids is that whilst amplification of sound output may be relatively accurate, the impression received by the client is often not.

- 20 It is common practice for most custom made hearing aids or custom made ear moulds to incorporate a vent and, depending upon the types of hearing impairment and the correction necessary, these vents can have variable diameters and can also extend to varying distances within the ear canal. The vent provides the user with an accurate

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impression of their own voice and are thus critical for acceptance and use of the hearing aid by the client.

Once the hearing aid has been cast for a particular individual comprising a prescribed form of vent it is not always possible to change this, therefore accurate determination of the vent requirements are imperative.

Previous methods and devices of dispensing hearing aids have not provided a means whereby the optimum venting requirements can be fully ascertained during testing and trialing procedures. It is an object of the present invention to overcome or substantially ameliorate the disadvantages of the prior art.

10 The invention provides, for use in testing the perception of hearing and the required amplification of a hearing aid, a plug adapted to be received in a client's ear which has passing therethrough two tubes, one which carries the output sound from a source, normally a hearing aid programmed to compensate for the client's disability, into the ear and the other which acts as a vent.

15 The device is designed to enable the hearing impaired person to get a truer and more accurate indication of their own voice and of the sound output of a hearing aid.

According to the invention, there is provided a tube which acts as a vent that can have different diameters and different lengths to enable the optimum size and position of the vent in a programmed hearing aid to be ascertained.

In order that the invention may be more readily understood I shall describe a particular form of the invention by way of exemplification. Reference will be made to the accompanying drawings in which:

Figure 2 shows a front, back and side view of the device.

Figures 1 and 2 show an ear plug 1 made from a resilient material which is adapted to be located in a client's ear 2 and to effectively reduce occlusion in the ear canal 3.

The material from which this plug 1 is made can vary widely but will normally be a foam material which can be compressed whilst the plug is inserted but, once inserted, moulds the client's ear canal 3 so as to make good contact with the skin.

Passing through the plug there is a first tube 4 which can preferably be a standard through tubing, which acts as a sound tube to carry the output sound from a source, normally a hearing aid which, for convenience, could be a behind the ear aid but could equally well be a bench mounted device usable for test purposes.

Also passing through the plug there is a vent aperture 5 which can preferably be a synthetic plastics tube which has a wall thickness sufficient not to be unduly distorted when the plug is placed in the ear.

The practitioner would have a set of these plugs, which are preferably disposable, having  
20 vents of differing lengths 6 and diameters.

There may even be formed with, say, a flared inner end so that they can closely match vents which are used with hearing aids.

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In order to test the effectiveness of the proposed hearing aid the aid is first programmed to satisfy what is believed to be the required correction for the particular client. Depending upon the extent and type of hearing impairment, the plug which has a vent member 5 passing through which, in the opinion of the dispenser, is likely to give an optimum result is selected.

The sound tube 4 is then connected to the hearing aid and the hearing aid is then trialed by the client either to consider a range of prerecorded sounds or otherwise, and the client speaks with the aid in position, and, from this, the practitioner can identify whether the aid is effective as far as correction of the hearing loss is concerned and, further, whether it gives the client comfort both as far as the sound is concerned and, particularly, the sound of his/her own voice.

If it is believed that the trial is not optimum it is possible to replace the plug 1 with a plug with a different vent 5 to see whether this gives a more satisfactory result. Increasing the vent to reduce occlusion or decreasing to avoid feedback.

Once the best arrangement has been achieved then the client can have a good indication as to how effective a hearing aid manufactured for the client and having the particular properties would be and, provided he/she is satisfied, then the dispenser can take normal impressions of the client's ears and order a hearing aid or custom made ear mould having the desired physical properties.

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We claim:

1. A device for the dispensing of hearing aids able to test the perception of hearing and determining correct amplification of the hearing aid, whereby a plug adapted to be received in a client's ear has passing therethrough two tubes, one which carries the output sound from a source into the ear and the other which acts as a vent.
2. An ear plug as claimed in claim 1 constructed from a resilient material adapted to be located in the client's ear to effectively reduce occlusion or feedback in the ear canal.
3. An ear plug as claimed in claim 2 whereby the resilient material will normally be a foam material adapted to be compressed whilst the plug is inserted into the ear, and once inserted will expand to contact the periphery of the ear canal creating a flexible, feedback reducing seal.
4. An ear plug as claimed in any preceding claim wherein the first tube carries the output sound from a source into the ear means whereby the sound tube can be connected to a hearing aid situated behind the ear or a bench mounted testing device emitting various prerecorded sounds.
5. An ear plug as claimed in claim 4 wherein the second tube passing therethrough is a vent aperture constructed from a synthetic plastic having a wall thickness adapted to eliminate undue distortion when the plug is placed into the ear.
6. An earplug as claimed in claim 5 in which the vent can have different diameters and lengths enabling its optimum size and position within a programmable hearing aid to be ascertained during testing.

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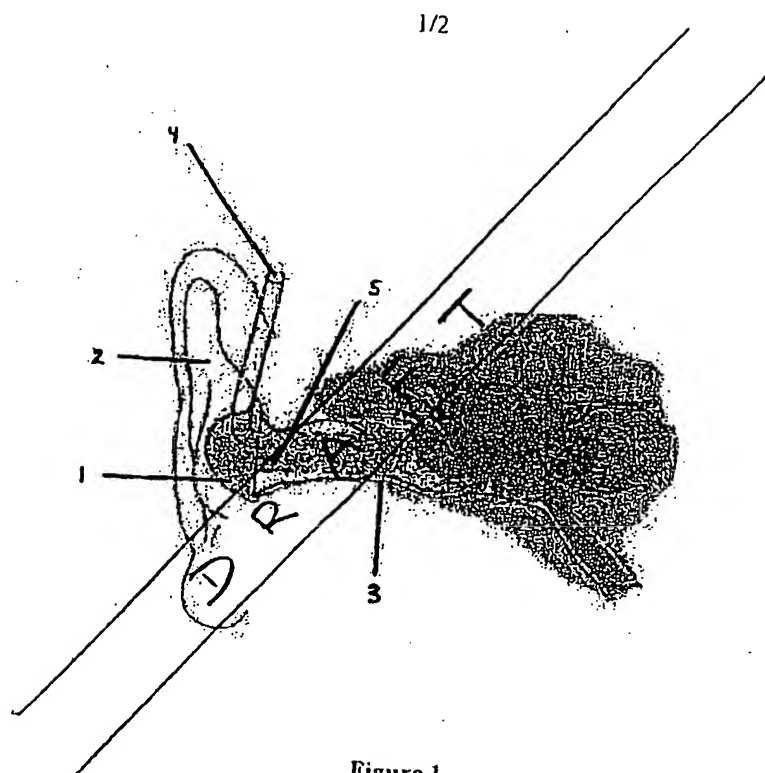
7. An earplug as claimed in claim 5 and 6 whereby the diameter of the vent can be increased to reduce occlusion in the ear canal or decreased to avoid receiving feedback, leaving the recipient of the hearing aid with a truer and more accurate impression of their own voice.
8. A device for the dispensing of hearing aids substantially as herein described with reference to the accompanying drawings.
9. A method whereby the device as claimed in any one of the preceding claims, aids in the dispensing of hearing aids by providing a means whereby the device can be connected to a hearing aid to test the perception and amplification of the hearing aid, enabling the optimum venting requirements to be ascertained.



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**Figure 1**

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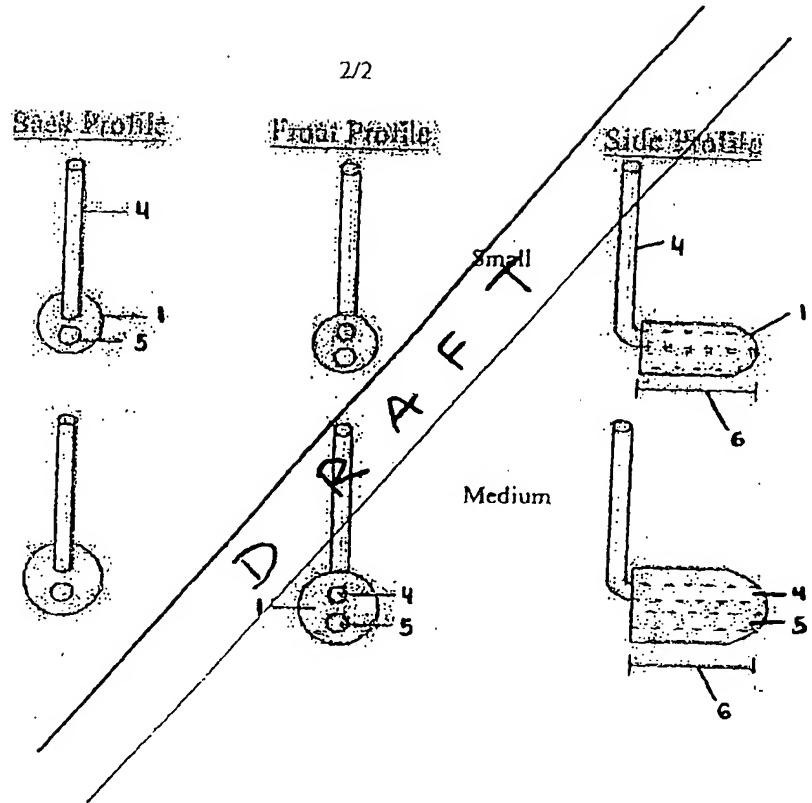
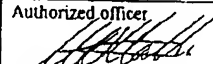


Figure 2

## INTERNATIONAL SEARCH REPORT

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<b>A. CLASSIFICATION OF SUBJECT MATTER</b>		
Int. Cl. <sup>7</sup> : H04R 25/00, A61B 08/12		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b>		
Minimum documentation searched (classification system followed by classification symbols)		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) Esp@ccNet, USPTO, WPAT - Keywords (hearing, deaf, aid, amplifier, vent, tube, test, perception, feedback, plug) and similar terms		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6167138 A (SHENNIB) 26 December 2000 column 17 line 36 - column 18 line 45, figures 11 & 15	1 - 9
X	US 5645074 A (SHENNIB et al.) 8 July 1997 figures 11 - 15, column 18 lines 11 - 25	1 - 9
A	DE 4338215 A1 (GEERS WOLFGANG) 11 May 1995 See whole document	1 - 9
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C <input checked="" type="checkbox"/> See patent family annex		
* Special categories of cited documents: "A" Document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" Document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" Document referring to an oral disclosure, use, exhibition or other means "P" Document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 4 February 2003		Date of mailing of the international search report 10 FEB 2003
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustalia.gov.au Facsimile No. (02) 6285 3929		Authorized officer  ROBERT BARTRAM FCR Telephone No.: (02) 6283 2215

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 92/21218 A1 (ENSONIQ CORPORATION) 26 November 1992 See whole document	1 - 9

## INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

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This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member					
US	6167138	US	5825894	US	5923764	AU	67236/96
		BR	9612098	CA	2235067	CN	1260104
		EP	868830	PL	329644	WO	9723117
US	5645074	CA	2260776	WO	9806330	AU	67730/96
		BR	9612703	EP	923342	AU	67236/96
		WO	9723117	BR	9612098	EP	868830
		CA	2235067	CN	1260104	PL	329644
		US	5825894	US	6167138	US	5923764
DE	4338215	NONE					
WO	9221218	AU	20280/92	EP	584259	US	5195139
END OF ANNEX							